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PHYTOGEOGRAPHICAL SIGNIFICANCE OF ENDEMIC GENERA (ANGIOSPERMS) IN PENINSULAR INDIA AND SRI LANKA

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ABSTRACT

The presence of endemic genera of restricted distribution occurring in Peninsular India and Sri Lanka is analysed in terms of its phytogeography. The genera are mainly of the palaeoendemic type. There are about 56 endemic genera in Peninsular India (Nayar, 1980) while in Sri Lanka there are only 20 genera. The presence of common genera (27 genera) with restricted distribution in Peninsular India and Sri Lanka is interesting from the phytogeographical angle.

INTRODUCTION

The southern portion of Peninsular India is geographically close to Sri Lanka and is separated by the shallow Palk Strait of about 100 km with shallow basin. The Indian plate of the Gondwanaland includes Sri Lanka and Peninsular India. Sri Lanka severed its connection from the mainland geologically in subrecent times. The highest mountain peak in Sri Lanka is Pidurutalagala (2527 m) while the highest mountain peak in W. Ghats is Anaimudi (2695 m). The study of common genera restricted to Sri Lanka and Peninsular India indicates the common origin in ancient times. As the Indian plate (Peninsular India + Sri Lanka) moved northwards to tropical and northern dry latitudes during late Cretaceous, the nature and composition of its flora changed leading to its impoverishment (Raven & Axelrod, 1974). In Peninsular India due to the flow of deccan lavas during Cretaceous-Eocene times and due to spreading aridity in Neogene-Quarternary, many taxa became extinct and the remnants continue to exist as relicts (Nayar, 1980). Though Sri Lanka in all perspectives is geographically and geologically part of the continental Peninsular India, its flora is unique, having more Malayan and Malagasian affinity than that of Peninsular India. However, 27 genera of Angiosperms (*Appendix-I*), which are manifestly common to Peninsular India and Sri Lanka indicate their common genetic stock with divergent phenotypic variations due to geographical and ecological barriers.

ENDEMIC GENERA

The nature of endemic taxa can be assesed on the following basis : (i) dominance of woody or arborescent habit, (ii) taxonomically isolated endemic taxa, (iii) disjunction in their distribution, (iv) presence of fossils.

The study of endemic genera of Peninsular India and Sri Lanka gives clue to the biogeography of its flora and its relative isolation in the past. The hill top floras of the W. Ghats in India behave like an island flora (Subramanyam & Nayar, 1974). The island of Sri Lanka has characteristic flora of its own, showing its relationship with Malayan and Malagasy elements. However, its relationship with southern Peninsular Indian flora is not very profound though geographically Sri Lanka is close to the Indian landmass.

There are about 56 endemic genera in Peninsular India of which 45 are monotypic

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(Nayar, 1982) while in Sri Lanka there are about 20 endemic genera of which 16 are monotypic (*Appendix-II*). In Peninsular India the families with the largest representation of endemic genera are of Poaceae (11 genera) and Acanthaceae (9 genera) while in Sri Lanka the family with the largest representation of endemic genera is Rubiaceae (4 genera). In Peninsular India, the endemic genus *Nilgirianthus* (Acanthaceae) has the largest representation (20 spp.), while in Sri Lanka the endemic genus *Stemonoporus* (Dipterocarpaceae) has the largest number of species (20 spp.). The arborescent endemic genera in Peninsular India are *Blepharistemma, Erinocarpus, Meteoromyrtus, Otonephilium, Poeciloneuron, Pseudoglochidion,* while in Sri Lanka the arborescent endemic genera are *Chlorocarpa, Dicellostyles, Glenniea, Hortonia, Julostylis, Loxococcus, Nargedia, Petchia, Phoenicanthus, Schumacheria, Scyphostachys, Stemonoporus* and *Walidda.* It is generally considered that woody life forms represent relicts. The two arborescent genera *Hortonia* and *Schumacheria* in particular, are believed to be the remnants of the original Gondwanaland stock (of 100 million years ago). Raven & Axelrod (1974) opined that these vascular plants might have survived the passage of the South Asian plate from its original position near Madagascar, northwards to the presentday position.

The taxonomically isolated endemic genera indicate the age of the flora from which they originated, since intermediate phylogenetically allied groups might have been extinct due to palaeoclimatic changes. In Peninsular India the following endemic genera are taxonomically interesting. The genus *Hubbardia* (Poaceae) is monotypic and is the only representative of the tribe *Hubbardeae,* with its unique spikelets (Bor, 1951). The genus *Haplothismia,* a monotypic genus (*H. exannulata*) of Kerala in the W. Ghats, represents taxonomically isolated tribe *Haplothismieae* of the family Burmanniaceae. The genus *Indotristicha* (*Tristichaceae*) with two species is endemic to southern W. Ghats and Sri Lanka. The following shrubby or tree endemic genera of Sri Lanka are taxonomically interesting : *Phoenicanthus* (Annonaceae), *Stemonoporus* (Dipterocarpaceae), *Chlorocarpa* (Flacourtiaceae), *Julostylis* (Malvaceae), *Loxococcus* (Palmae), *Leucocodon, Schizostigma, Scyphostachys* (Rubiaceae), *Glenniea* (Sapindaceae).

Sri Lanka seems to support a kind of 'subcontinental biosystem' rather than an 'island biosystem' as such, by virtue of the fact that it was a part of the continental Peninsular India during the Cretaceous period. The flora of Sri Lanka must have evolved to its present state from a complete balanced continental flora through gradual impoverishment by extinction of some species counterbalanced to a certain degree by the formation of new species through mutation, ploidy etc.

APPENDIX I

Endemic genera common to Peninsular India and Sri Lanka

Genera/Component species	Habit	Peninsular India	Sri Lanka
Byrsophyllum Hook. f. (Rubiaceae)			
B. tetrandrum Hook.f.	Tree	Southern W. Ghats, Tirunelveli & Travancore hills	Nil
B. ellipticum Bedd.	Small tree	Nil	Hinidume Patta Sri Lanka
Chloroxylon DC. (Flindersiaceae)			
C. swietenia DC.	Tree	Southern W. Ghats	Sri Lanka—Dry region

Genera/Component species	Habit	Peninsular India	Sri Lanka
Coelachyropsis Bor (Poaceae)			
C. lagopoides Bor	Herb	Southern Peninsular India	Sri Lanka
Cottonia Wt. (Orchidaceae)			
C. peduncularis (Lindl.) Thw.	Epiphytic herb	Southern W. Ghats	Sri Lanka
Cullenia Wt. (Bombacaceae)			
C. ceylanica (Gard.) Kosterm.	Tree	Nil	Sri Lanka.
C. rosayroana (Kosterm.) Robyns	,,	Nil	Sri Lanka
C. exarillata Robyns	,,	Southern W. Ghats	Nil
Didyplosandra Wt. (Acanthaceae)			
D. andersonii (Bedd.) Bremek.	Large shrub	Anamalai & Travancore hills of southern W. Ghats	Nil
D. bolumpattiana (Bedd.) Bremek.	,,	Bolumpatti hills of southern W. Ghats (1500—2300 m)	Nil
D. hookeri (Nees) Bremek.	Shrub	Nil	Sri Lanka
D. lanceolata (Hook. ex Nees) Bremek.	,,	Nil	Sri Lanka
D. laxa (T. And.) Bremek.	,,	Nil	Sri Lanka
D. lurida (Wt.) Bremek.	Large shrub	Nilgiris & Travancore hills of southern W. Ghats	Nil
D. vestita (Nees) Bremek.	Shrub	Nil	Sri Lanka
Eleiotes DC. (Leguminosae)			
E. sororia (L.) DC.	Herb	Widely distributed in Peninsular India from Bihar to Tamil Nadu	Widely distributed in Sri Lanka
Farmeria Willis (Podostomaceae)			
F. indica Willis	,,	Tirunelveli hills in southern W. Ghats	Nil
F. metzgerioides Willis	,,	Nil	Nil
Fergusonia Hook. f. (Rubiaceae)			
F. tetracocca (Thw.) Baill.	Prostrate herb	Southern W. Ghats	Sri Lanka
Humboldtia Vahl (Leguminosae)			
H. bourdilloni Prain	Tree	Southern W. Ghats in Kerala	Nil
H. brunonis Wall.	Shrub/Tree	Southern W. Ghats, S. Kanara southwards	Nil
H. decurrens Bedd.	Tree	Southern W. Ghats, Travancore & Tirunelveli	Nil
H. laurifolia Vahl	Small tree	Southern W. Ghats	Sri Lanka in damp places
H. unijuga Bedd.	Large tree	Southern W. Ghats, Travancore & Tirunelveli	Nil
H. vahliana Wt.	Tree	Southern W. Ghats, Nilgiris southwards	Nil
Kendrickia Hook. f. (Melastomataceae)			
K. walkeri Hook. f.	Epiphytic shrub	Southern W. Ghats, Anamalais	Sri Lanka, Adams peak
Lagenandra Dalz. (Araceae)			
L. koenigii Thw.	Herb with rootstock	Nil	Sri Lanka in wet places
L. insignis Trim.	,,	Nil	Sri Lanka—banks of streams
L. lancifolia Thw.	,,	Nil	Sri Lanka—banks of streams
L. thwaitesii Engl.	,,	Nil	Sri Lanka in wet places. Rare
L. toxicaria Dalz.	,,	Peninsular India in shallow water	Sri Lanka in moist places
L. toxicaria Dalz. var. *barnesii* Fischer	,,	Tamil Nadu	Nil

Genera/Component species	Habit	Peninsular India	Sri Lanka
Leptacanthus Nees (Acanthaceae)			
L. amabilis (Clarke) Bremek.	Large sticky shrub	Southern W. Ghats, Nilgiris	Nil
L. helicoides Nees	Shrub	Nil	Sri Lanka
L. paniculatus Bremek.	,,	Nil	Sri Lanka
L. rubicundus Nees	Slender shrub	W. Ghats, Wynaad to Travancore & Tirunelveli hills	Nil
L. walkeri Nees	Shrub	Nil	Sri Lanka
Lopholepis Decne (Poaceae)			
L. ornithocephala (Hook.) Steud.	Perennial herb	Peninsular India	Sri Lanka
Mackenziea Nees (Acanthaceae)			
M. arguta (Nees) Bremek.	Shrub	Nil	Sri Lanka
M. gracillis (Bedd.) Bremek.	Large shrub	Southern W. Ghats, Anamalais, Palni & Travancore hills	Nil
M. hirsutissima (Nees) Bremek.	Shrub	Nil	Sri Lanka
M. homotrapa (Nees) Bremek.	Large shrub	Southern W. Ghats, Nilgiris	Nil
M. integrifolia (Dalz.) Bremek.	Spreading shrub	W. Ghats in Mahabaleshwar & Karnataka	Nil
M. newii (Bedd. ex Cl.) Bremek.	Small shrub	W. Ghats, Karnataka	Nil
M. sessilis Nees	Shrub	Nil	Sri Lanka
M. sexennis (Nees) Bremek.	,,	Nil	Sri Lanka
M. violacea (Bedd.) Bremek.	Large shrub	Southern W. Ghats, Nilgiris	Nil
Meyenia Nees (Thunbergiaceae)			
M. hawtayneana (Wall.) Nees	Climbing undershrub	Peninsular India	Sri Lanka
Mischodon Thw. (Euphorbiaceae)			
M. zeylanicus Thw.	Evergreen tree	Southern W. Ghats, Anamalai & Tirunelveli hills	Sri Lanka—forests in dry region
Neurocalyx Hook. (Rubiaceae)			
N. calycinus (R. Br. ex Benn.) Robins	Semiwoody perennial herb	Southern W. Ghats	Nil
N. championii Benth.	,,	Nil	Sri Lanka—rare, in damp parts
N. gardneri Thw.	,,	Nil	Sri Lanka—rare, in damp forest
N. wightii Arn.	,,	Nil	Sri Lanka in damp sandy places
N. zeylanicus Hook.	,,	Nil	Sri Lanka—moist regions
Pommereulla L. f. (Poaceae)			
P. cornucopiae L. f.	Perennial grass	Peninsular India	Sri Lanka
Sirhookera Kuntze (Orchidaceae)			
S. lanceolata (Wt.) O. Kuntze	Epiphytic herb	W. Ghats	Sri Lanka common in lower montane zone
S. latifolia (Wt.) O. Kuntze	,,	W. Ghats	Sri Lanka (?)
Stenosiphonium Nees (Acanthaceae)			
S. confertum Nees	Erect shrub	Peninsular India—Deccan	Nil
S. cordifolium (Vahl) Alston	,,	W. Ghats of Tamil Nadu & Kerala	Nil
S. parviflorum T. And.	,,	Peninsular India—Deccan & westwards to Travancore	Nil
S. russelianum Nees	,,	Peninsular India—Deccan & leeward side of W. Ghats	Sri Lanka
S. setosum T. And.	,,	Hills of Deccan leeward side of W. Ghats	Nil
S. wightii Bremek.	,,	W. Ghats, Tirunelveli hills	Nil

Genera/Component species	Habit	Peninsular India	Sri Lanka
Terniola Tul (Podostemaceae)			
T. zeylanica (Gardn.) Tul	Herb	W. Ghats	Sri Lanka
Thelepaepale Bremek. (Acanthaceae)			
T. ixiocephala (Benth.) Bremek.	Small straggling shrub	W. Ghats of Karnataka	Sri Lanka
Theriophonum Bl. (Araceae)			
T. dalzellii Schott	Small cormous herbs	Peninsular India—Maharashtra & Karnataka	Nil
T. fischeri Sivadasan	,,	Southern W. Ghats—Kerala & southwestern Tamil Nadu	Nil
T. infaustum N. E. Brown	,,	Southwestern part of Peninsular India (Kerala)	Nil
T. minutum (Willd.) Baillon	,,	Throughout Peninsular India (except Maharashtra & Kerala)	Sri Lanka—in most districts
T. sivaganganum (Ramam. & Seb.) Bogner	,,	Southern Tamil Nadu, Ramanathapuram dist.	Nil
Thraulococcus Radlk. (Sapindaceae)			
T. erectus (Thw.) Radlk.	Tree	Southern W. Ghats, Wynaad southwards	Sri Lanka
T. simplicifolius Radlk.	Tree/shrub	Nil	Sri Lanka
Vateria L. (Dipterocarpaceae)			
V. copallifera (Retz.) Alston	Tree	Nil	Sri Lanka—widespread in wet zone
V. indica L.	,,	Southern W. Ghats, Karnataka, Kerala & Tirunelveli of Tamil Nadu	Nil
V. macrocarpa Gupta	,,	S. W. Ghats of Kerala	Nil
Zenkeria Trin. (Poaceae)			
Z. elegans Trin.	Herb	Peninsular India	Nil
Z. obtusifolia Benth.	,,	Nil	Sri Lanka—western province at low elevation
Z. stapfii Henrard	,,	W. Ghats, Nilgiris	Sri Lanka
Z. sebastinei Henry et Chandr.	,,	Peninsular India—Tamil Nadu	Nil
Z. jainii N. C. Nair, Sree Kumar & V. J. Nair	,,	Peninsular India—Kerala	Nil

APPENDIX II

Endemic Genera in Sri Lanka

Name of genera	No. of species	Habit
Adrorhizon Hook. f. (Orchidaceae) *A. purpurascens* Hook f.	1 sp.	Epiphytic herb
Championia Gard (Gesneriaceae) *C. reticulata* Gardn.	2 spp.	Perennial herb
Chlorocarpa Alston (Flacourtiaceae) *C. pentaschista* Alston	1 sp.	Tree
Dicellostyles Benth. (Malvaceae) *D. axillaris* Benth.	1 sp.	,,
Glenniea Hook. f. (Sapindaceae) *G. zeylanica* Hook. f.	1 sp.	,,
Hortonia Wight (Monimiaceae) *H. angustifolia* (Thw.) Trim. *H. floribunda* Wt. ex Arn.	2 spp.	Shrub
Ipsea Lindl. (Orchidaceae) *I. speciosa* Lindl.	1 sp.	
Julostylis Thw. (Malvaceae) *J. angustifolia* Thw.	1 sp.	Slender tree
Leucocodon Gardn. (Rubiaceae) *L. reticulatum* Gardn.	1 sp.	Epiphytic climbing shrub
Loxococcus Gardn. (Palmae) *L. rupicola*	1 sp.	Tree

Name of genera	No. of species	Habit
Nargedia Bedd. (Rubiaceae) *N. macrocarpa* Bedd.	1 sp.	Shrub
Petchia Livera (Apocynaceae) *P. ceylanica* (Wight) Livera	1 sp.	Small glabrous shrub
Phoenicanthus Alston (Annonaceae) *P. obliqus* (Hook. f. & Thoms.) Alston	1 sp.	Tree
Plaesianthera Livera (Acanthaceae) *P. thwaitesii* Livera	1 sp.	Erect viscid herb
Podadenia Thw. (Euphorbiaceae) *P. thwaitesii* (Baill.) Muell.-Arg.	1 sp.	
Schizostigma Arn. (Rubiaceae) *S. hirsutum* Arn.	1 sp.	Creeping herb
Schumacheria Vahl (Dilleniaceae) *S. alnifolia* Hook. f. & Thoms. *S. angustifolia* Hook. f. & Thoms. *S. castaneifolia* Vahl	3 spp.	Woody climbers
Schyphostachys Thw. (Rubiaceae) *S. pedunculatus* Thw. *S. coffeoides* Thw.	2 spp.	Shrubs
Stemonoporus Thw. (Dipterocarpaceae) (includes Monoporandra Thw.) *S. acuminatus* (Thw.) Bedd. *S. affinis* Thw. *S. angustisepalus* Kosterm. *S. bullatus* Kosterm. *S. canaliculatus* Thw. *S. ceylanicus* (Wt.) Alston *S. cordifolius* (Thw.) Alston *S. elegans* (Thw.) Alston *S. gardneri* Thw. *S. gracilis* Kosterm. *S. kanneliyensis* Kosterm. *S. lanceolatus* Thw. *S. lancifolius* (Thw.) Ashton *S. latisepalus* Kosterm. *S. nitidus* Thw. *S. oblongifolius* Thw. *S. petiolaris* Thw. *S. reticulatus* Thw. *S. revolutus* Trimen ex Hook. f. *S. rigidus* Thw.	20 spp.	Trees
Walidda (A. DC.) M. Pichon (Apocynaceae) *W. antidysentrica* (L.) M. Pichon	1 sp.	Slender shrub

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